3.0 Sherwood

Sherwood Site Long-Term Custody Compliance Requirements

The following list comprises the long-term custody compliance requirements for the Sherwood site as defined in Section 3.2 of the site Long-Term Surveillance Plan:

1. Annual site inspection.
2. Annual inspection report.
3. Follow-up inspections and inspection reports, as necessary.
4. Site maintenance as necessary to sustain design functions.
5. Emergency measures in the event of catastrophe.
6. Environmental monitoring as required.

The Sherwood site long-term custody compliance requirements were fulfilled for 2001 as follows:

1. The site was inspected on October 24, 2001 in accordance with the inspection procedure as outlined in Section 3.3.2 of the Long-Term Surveillance Plan (LTSP).
2. This document serves as the annual inspection report.
3. No follow-up inspections were necessary.
4. No maintenance was necessary to sustain design functions.
5. No catastrophic events necessitated emergency measures.
6. The required ground-water monitoring, as specified in Section 3.7.1 of the LTSP, and the Dam Safety Inspection specified in Appendix D of the LTSP, were completed and the results are summarized in this report.

Sherwood Site Inspection Results

M.P. Plessinger (Chief Inspector) and M. K. Kastens (Assistant Inspector), both of MACTEC–ERS, the Technical Assistance Contractor at the DOE Grand Junction Office (GJO), conducted the inspection on October 24, 2001. J. P. Gilmore of the DOE–GJO assisted with the inspection and D. Stoffel of the Washington Department of Health accompanied the inspectors. The inspection was conducted in accordance with the *Long-Term Surveillance Plan* (LTSP) *for the DOE Sherwood Project (UMTRCA Title II) Reclamation Cell, Wellpinit, Washington,* (February 2001) and procedures established by DOE–GJO to comply with the requirements of Title 10 *Code of Federal Regulations* Part 40.28 (10 CFR 40.28). Because this was the initial annual inspection, a large number of photographs were taken to record baseline conditions.

The purposes of the annual inspection are to confirm the integrity of visible features at the site, to identify changes in conditions that may affect site integrity, and to determine the need, if any, for maintenance or additional inspections and monitoring.

Forty-four photographs are included in the Sherwood report. The photographs are referred to in the text of the report and on Figure 3–1 by photograph location (PL) numbers. Photographs taken of different views from a common location are identified by a letter following the photograph location number (PL–17A and PL–17B, for example).

Access Road and Perimeter Signs

The Bureau of Indian Affairs (BIA) maintains the all-weather site access road. A double-swing steel gate controls access to the Sherwood mine area and Tribe-owned facilities near the disposal site. There is a DOE lock on the gate in addition to the Tribe's lock.

Six perimeter or warning signs, designated P1 through P6, are placed at likely access points around the site property. The signs are attached at a height of about 5 feet above ground to steel posts set in concrete. Perimeter sign P4, north of the site, was placed at a fence boundary north of the actual site boundary along the old two-track road that approaches the site from the northeast. A typical perimeter sign is shown in photograph PL–1.

Site Marker and Boundary Monuments

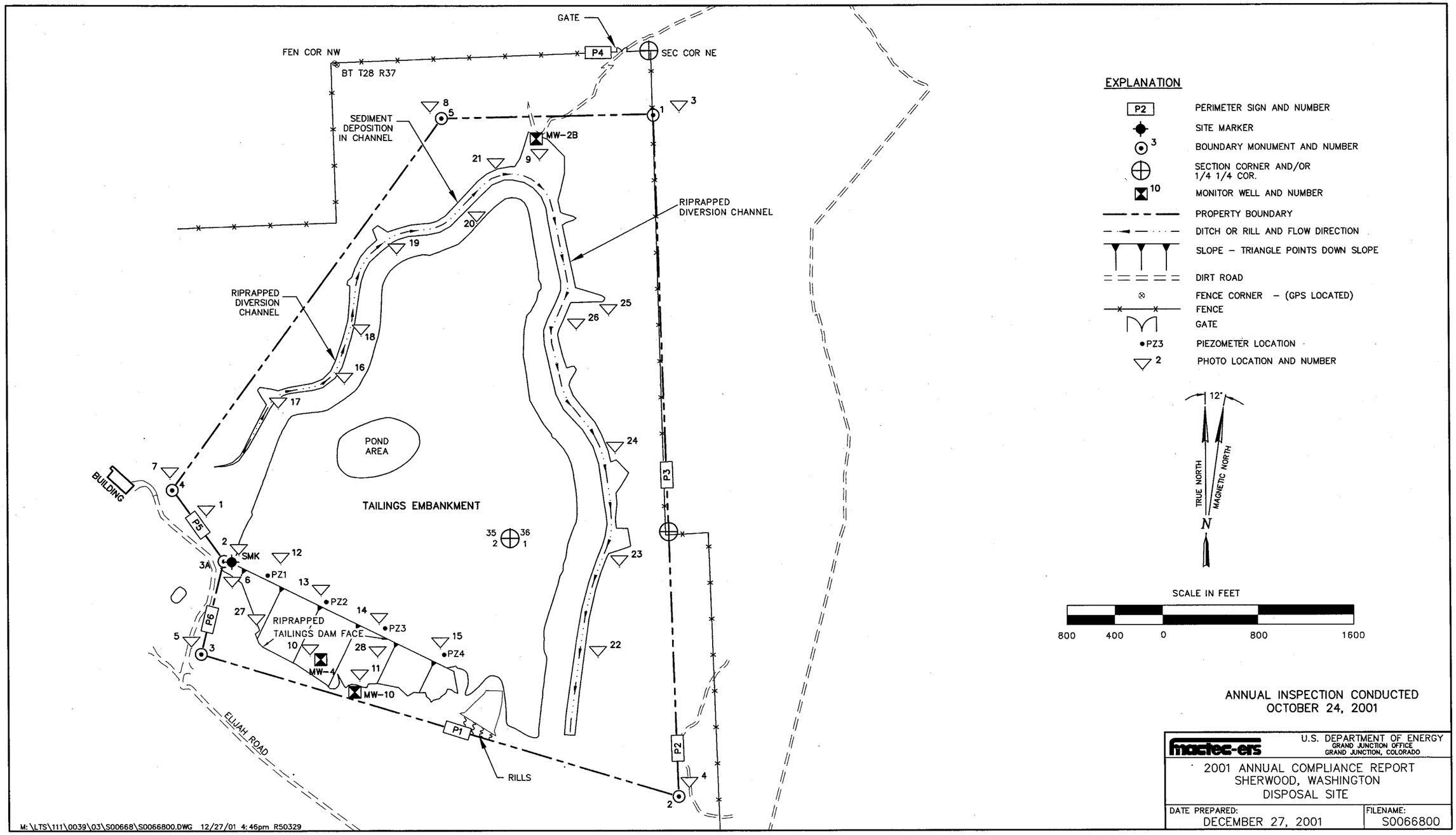
One inscribed granite site marker (PL–2) is present on the site near the southwest boundary of the site property where the access road lies closest to the site boundary. The marker is in excellent condition.

Six boundary monuments designated BM–1, BM–2, BM–3, BM–3A, BM–4, and BM–5 define the site boundary. The monuments are shown in photographs PL–3 through PL–8. The monuments are all in new condition.

Monitor Wells and Piezometers

There are three monitor wells at the Sherwood site designated MW–2B, MW–4, and MW–10. The wells are shown in photographs PL–9, PL–10, and PL–11, respectively. MW–2B is the up gradient or background well. MW–4 and MW–10 are point-of-compliance wells. These three wells are sampled for sulfate, chloride, and total dissolved solids annually as a best management practice. All results from the July 2001sampling event were within anticipated ranges and acceptable limits.

Four piezometers along the crest of the tailings dam, designated PZ–1 through PZ–4, are shown in PL–12 through PL–15. The piezometers were installed in November 2000 as part of the Dam Safety Inspection program. The piezometers are used to determine if saturation conditions exist within the tailings dam. At the time of installation PZ–2 contained slightly more than three feet of water. During the July 2001 sampling event PZ–2 contained slightly less than two feet of water. All other piezometers were dry at installation and dry during the July 2001 sampling event. Consequently the tailings dam is considered to be in an unsaturated condition, as desired.



macTec-ers	U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE GRAND JUNCTION, COLORADO
2001 ANNUAL COMPLIANCE REPORT SHERWOOD, WASHINGTON DISPOSAL SITE	
DATE PREPARED: DECEMBER 27, 2001	FILENAME: S0066800

Figure 3–1. Sherwood, Washington, 2001 Inspection Drawing

Tailings Impoundment Cover

The tailings impoundment cover for the Sherwood site consists of 12 to 20 feet of uncompacted soils. Trees, shrubs, forbs, and grasses have been planted on the cover to accelerate the revegetation of the disturbed cover soils. A panoramic overview of the tailings impoundment cover is shown in photographs PL–16A through PL–16H. Inspectors walked parallel traverses across the impoundment cover to inspect this transect. There was no evidence of differential settlement other than the pond area observed during earlier orientation inspections. The pond area did not appear to have expanded in size.

In general vegetation is becoming well established. As is typical, some areas are progressing faster than other areas. The pond area was dry at the time of the inspection; however, the plant species present indicate that there is year-round moisture below the surface. Vegetation in the pond area is composed primarily of native wetland species such as hardstem bulrush (*Scirpus acutus*), Olney threesquare (*Scirpus americanus*), common spikerush (*Eliocharis palustris*), sandbar willow (*Salix exigua*), and plantain (*Plantago eriopoda*). The pond provides habitat for small mammals, birds, and reptiles and appears to be a water source for larger mammals such as deer and elk, whose sign was abundant in this area.

Diversion Channel and Impoundment Dam Face

Inspectors walked the length of the diversion channel and took a series of photographs (PL–17 through PL–26). Volunteer plant intrusion within the diversion channel is evident in most of the photographs. This plant intrusion is not expected to interfere with the design function of the diversion channel. Riprap placement and rock condition are the same as observed during earlier orientation inspections. Sediment deposition is evident in places on the west side of the diversion channel (PL–20A and PL–20B). Sediment deposition currently does not interfere with the design function of the diversion channel. The degree of sediment deposition should be noted during future inspections although it is not expected to increase to the degree that it could become a maintenance issue. Standing water was observed in the channel along the east side of the impoundment (PL–24B).

The impoundment dam face was inspected and photographed (PL–27A and PL–27B). The dam was inspected in accordance with the appended Dam Inspection Checklist (see Appendix A). No evidence of seepage, slumping, erosion, or instability was observed. In July 2001 water level measurements were made in the four piezometers installed across the crest of the dam to evaluate dam saturation conditions. Piezometer PZ–2 had 1.95 feet of water in the bottom of the casing. Piezometers PZ–1, PZ–3, and PZ–4 were dry. PZ–2 had 3.05 feet of water upon installation in November 2000. These results demonstrate that the impoundment dam continues to exist in an unsaturated state. Photograph PL–28 shows an undesirable weed species (dalmation toadflax) growing on the dam face.

Site Perimeter, Outlying Areas, and Balance of Site

The inspectors covered the site perimeter while searching for boundary monuments and warning signs. No evidence of off site activity that could affect the integrity of the tailings impoundment was observed. The site is surrounded by ponderosa pine forest. The site property as well as all surrounding lands is part of the Spokane Tribe of Indians Reservation. There are no residences within 0.25 mile of the site boundary.

Ground-Water Monitoring and Piezometer Water Level Results

Both the required ground-water sampling and the piezometer water level measurements were conducted on July 27, 2001. Ground-water constituent concentrations were less than the action level (Washington water quality criteria) for confirmatory sampling. Ground-water analytical results and piezometer water levels are presented in Table 3–1 and 3–2, respectively.

Table 3–1. Ground-Water Sampling and Analysis Results Summary, July 2001

Constituent	Water Quality Criteria	Background Well MW–2B	POC Well MW–4	POC Well MW–10
Chloride, mg/L	250	1.460	6.290	2.350
Sulfate, mg/L	250	3.040	27.500	25.500
TDS, mg/L	N/A	242	445	742

N/A = not applicable
mg/L = milligrams per liter

Table 3–2. Piezometer Water Levels, November 2000 and July 2001

Parameter	PZ–1	PZ–2	PZ–3	PZ–4
Water Level, November 2000 (initial reading at installation)	Dry	3.05 feet	Dry	Dry
Water Level, July 2001	Dry	1.95 feet	Dry	Dry

Conclusion

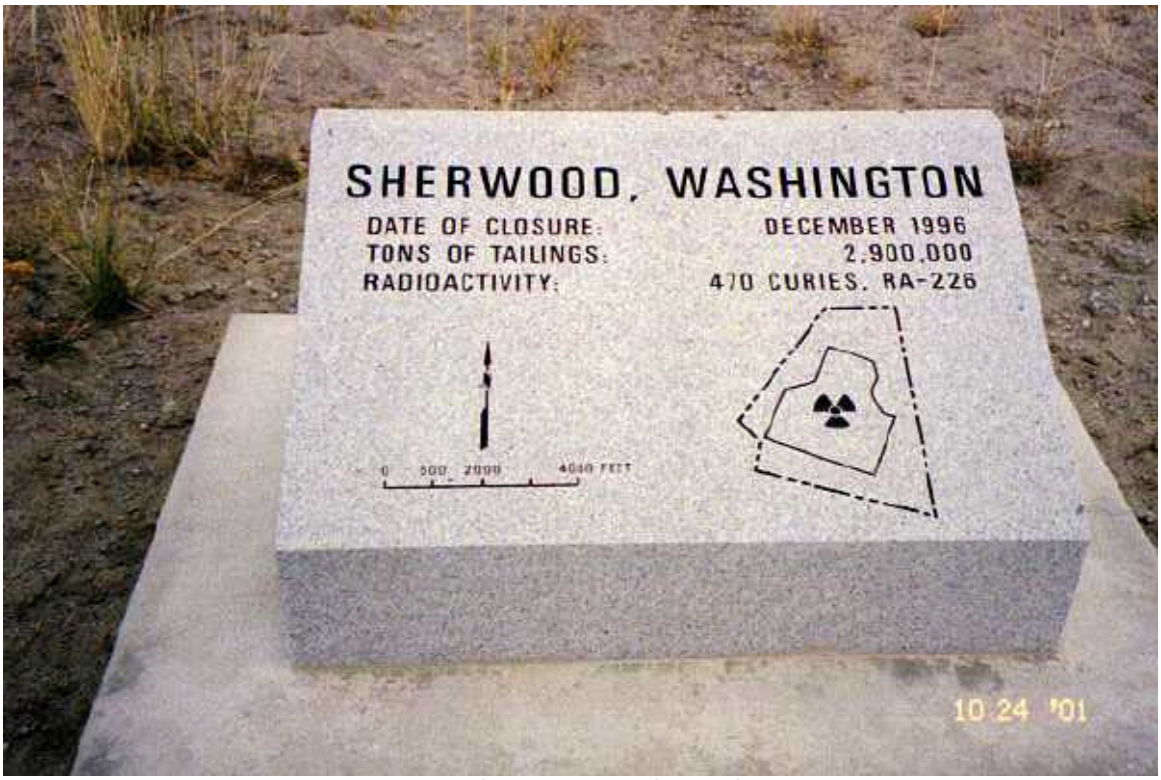
The Sherwood disposal site is in good condition at this time. No issues were identified during the dam safety inspection and no evidence of excessive settlement was observed in the pond area. The pond was dry at the time of the inspection. Ground-water monitoring and piezometer water level measurements conducted in July 2001 showed all measured parameters to be within acceptable ranges.

Sherwood Inspection Photographs

Table 3–3. Photograph Descriptions for Sherwood, Washington, Disposal Site

Photograph Location Number	Description
SHE PL–1	Typical perimeter sign
SHE PL–2	Site Marker
SHE PL–3	Boundary Monument BM–1
SHE PL–4A	Boundary Monument BM–2
SHE PL–4B	Boundary Monument BM–2
SHE PL–5	Boundary Monument BM–3
SHE PL–6	Boundary Monument BM–3A
SHE PL–7	Boundary Monument BM–4
SHE PL–8	Boundary Monument BM–5
SHE PL–9	Monitor Well MW–2B
SHE PL–10	Monitor Well MW–4
SHE PL–11	Monitor Well MW–10
SHE PL–12	Piezometer PZ–1
SHE PL–13	Piezometer PZ–2
SHE PL–14	Piezometer PZ–3
SHE PL–15	Piezometer PZ–4
SHE PL–16A	Panorama of impoundment cover
SHE PL–16B	Panorama of impoundment cover
SHE PL–16C	Panorama of impoundment cover
SHE PL–16D	Panorama of impoundment cover
SHE PL–16E	Panorama of impoundment cover
SHE PL–16F	Panorama of impoundment cover
SHE PL–16G	Panorama of impoundment cover
SHE PL–16H	Panorama of impoundment cover
SHE PL–17A	West diversion channel
SHE PL–17B	West diversion channel
SHE PL–18A	West diversion channel
SHE PL–18B	West diversion channel
SHE PL–19A	Groin-west diversion channel
SHE PL–19B	Groin-west diversion channel
SHE PL–20A	Sediment-west diversion channel
SHE PL–20B	Sediment-west diversion channel
SHE PL–21	North diversion channel
SHE PL–22A	East diversion channel
SHE PL–22B	East diversion channel
SHE PL–23A	East diversion channel
SHE PL–23B	East diversion channel
SHE PL–24A	East diversion channel
SHE PL–24B	East diversion channel
SHE PL–25	East diversion channel
SHE PL–26	East diversion channel
SHE PL–27A	Impoundment dam face
SHE PL–27B	Impoundment dam face
SHE PL–28	Toadflax on dam face

SHE 10/2001. PL–1. Typical perimeter sign.



SHE 10/2001. PL–2. Site Marker.

SHE 10/2001. PL–3. Boundary Monument BM–1.

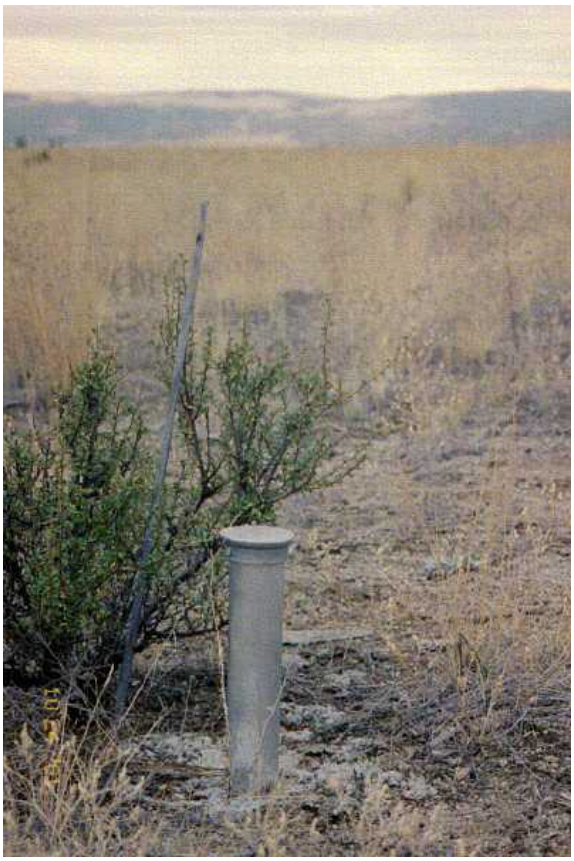
SHE 10/2001. PL–4A. Boundary Monument BM–2.

SHE 10/2001. PL–4B. Boundary Monument BM–2.

SHE 10/2001. PL–5. Boundary Monument BM–3.

SHE 10/2001. PL–6. Boundary Monument BM–3A.

SHE 10/2001. PL–7. Boundary Monument BM–4.



SHE 10/2001. PL–8. Boundary Monument BM–5.

SHE 10/2001. PL–9. Monitor Well MW–2B.

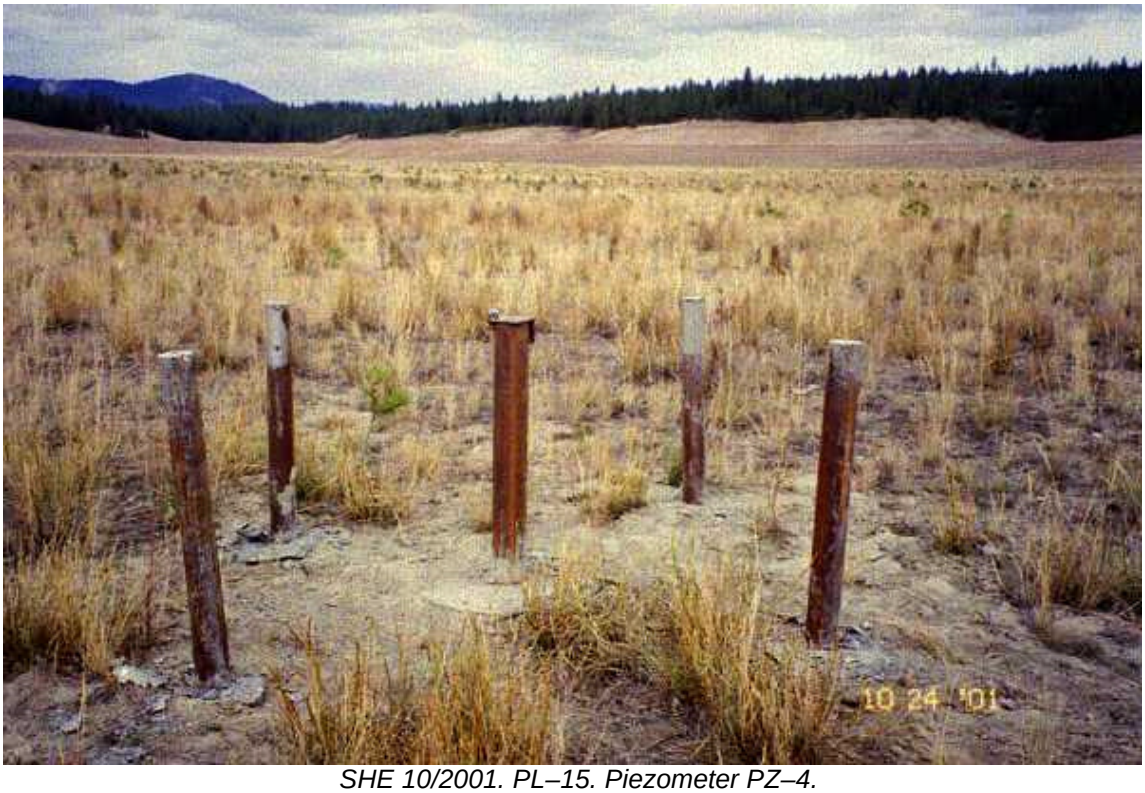
SHE 10/2001. PL–10. Monitor Well MW–4.

SHE 10/2001. PL–11. Monitor Well MW–10.

SHE 10/2001. PL–12. Piezometer PZ–1.

SHE 10/2001. PL–13. Piezometer PZ–2.

SHE 10/2001. PL–14. Piezometer PZ–3.



SHE 10/2001. PL–15. Piezometer PZ–4.

SHE 10/2001. PL–16A. Panorama of impoundment cover.

SHE 10/2001. PL–16B. Panorama of impoundment cover.

SHE 10/2001. PL–16C. Panorama of impoundment cover.

SHE 10/2001. PL–16D. Panorama of impoundment cover.

SHE 10/2001. PL–16E. Panorama of impoundment cover.

SHE 10/2001. PL–16F. Panorama of impoundment cover.

SHE 10/2001. PL–16G. Panorama of impoundment cover.

SHE 10/2001. PL–16H. Panorama of impoundment cover.

SHE 10/2001. PL–17A. West diversion channel.

SHE 10/2001. PL–17B. West diversion channel.

SHE 10/2001. PL–18A. West diversion channel.

SHE 10/2001. PL–18B. West diversion channel.

SHE 10/2001. PL–19A. Groin-west diversion channel.

SHE 10/2001. PL–19B. Groin-west diversion channel.

SHE 10/2001. PL–20A. Sediment-west diversion channel.

SHE 10/2001. PL–20B. Sediment-west diversion channel.

SHE 10/2001. PL–21. North diversion channel.

SHE 10/2001. PL–22A. East diversion channel.

SHE 10/2001. PL–22B. East diversion channel.

SHE 10/2001. PL–23A. East diversion channel.

SHE 10/2001. PL–23B. East diversion channel.

SHE 10/2001. PL–24A. East diversion channel.

SHE 10/2001. PL–24B. East diversion channel.

SHE 10/2001. PL–25. East diversion channel.

SHE 10/2001. PL–26. East diversion channel.

SHE 10/2001. PL–27A. Impoundment dam face.

SHE 10/2001. PL–27B. Impoundment dam face.

SHE 10/2001. PL–28. Toadflax on dam face.